

VouMove Technology for Engineers Journal

Background

VouMove Technology is a Cork based start-up specialising in the area of 'Physical Performance Technology'. As the phrase suggests, 'Physical Performance Technology' refers to the use of technology to assist with human physical performance, in terms of strength, power, speed, mobility etc. The company's first and current product, titled simply 'VouMove', is a software application used to measure, monitor and analyse strength training exercises for the Strength and Conditioning aspect of the amateur and professional sports market.

VouMove is developed on the Microsoft 'Kinect for Windows' platform using the Software Developers Kit made available by Microsoft and the motion sensing camera device of the same name. In the VouMove product's current capacity the Kinect camera records the individual as they perform a selected strength training exercise and provides a range of different data regarding the co-ordinates and changes in some of specific points in the body. The VouMove software then smoothens and extracts this data to give the required measurements and analysis which forms the basis of the product.

'Kinect' Research Process

When we first got together in the early summer of 2012 we were planning to focus on the area of data and analytics but we wanted to do something that would be a bit more interactive and align with our own personal interests, mainly sport and technology, rather than developing a data analytics tool, of which the software market currently is flooded in. The origin of our current direction came from discovering the Windows version of the 'Kinect' camera, better known as a gaming peripheral for the Xbox system, which allowed for third party development on the platform. We delved into the internals of the camera to discover what it was capable of in terms of motion sensing and were impressed by its capabilities.

Immediately what stood out to us was the fact that the motion and movement of a body of mass, whether it's a person or a thing, could be sensed and tracked to an accurate level without the need for any attachments to the mass. Two of us in the company have a background in sport at both a recreational and competitive level so we looked at several different potential applications in this area. Some of the things we played around with were tracking the flight of balls in different sports, which we quickly discovered was a very well catered for market, or coming up with something that would predict the length, speed and direction of a 'kickout' or ball strike from the contact made with the ball.

What we were really looking for though, was an area where we could leverage what we thought were two of main advantages of our chosen platform, lack of physical attachments and immediate information, to a maximum effect, perhaps improving an existing area where the need for attachments and data that has to be manually collected were seen as a hindrance to the process.

Sport/Strength and Conditioning Research Process

Through our contacts with University College Cork (all three company founders and directors were graduates of UCC's Masters Degree in Business Information Studies in 2012) we got in touch with the Human Performance Laboratory based in the Mardyke Arena, which is the UCC affiliated gym in Cork City. This proved to be an excellent opportunity for us to see in detail what kind of technology was currently being used in sport in terms of monitoring the individual rather than the ball or playing equipment.

Through some basic research and discussions with sports professionals it was obvious that an area of huge importance to everyone involved is the Strength and Conditioning aspect of sports training. Athletes at any level strive to be as powerful and explosive as possible and measuring and tracking these physical characteristics can prove to be invaluable data. A lot of coaches consider explosive power to be the single most beneficial attribute available to an athlete. Measuring this isn't an exact science but the most popular method is through strength training in the gym, performing the big compound exercise such as barbell squat, deadlift, bench press and overhead press, with as much weight and generating as much power and velocity as possible.

We set about researching in detail what technology and methods strength and conditioning coaches used to measure 'explosive power' and found a lot of very similar products that all involved a combination of either physical attachments, dated user intensive software and time consuming set ups. We knew that, with the team and expertise we had and resources available to us, we could develop a product that bypassed these limitations to give a faster, easier method of providing this information to coaches.

Technical Challenges

The VouMove product is a physical performance measurement tool applied to strength training in which its basic functionality is that it measures the amount of power and velocity generated by an athlete performing major strength training exercises such as squat, deadlift, bench and overhead press. Immediate, accurate data is provided for each rep, set or session, without the need for attachments or much user involvement. To achieve this functionality our main challenge was around the issue of 'signal analysis', that being analysing the signal coming from the depth sensor in the device, which internally consists of an infrared laser projector combined with a CMOS sensor.

Being able to correctly analyse the signal was essential in being able to extract the usable data we required in order to then produce the necessary outputs. As the device provides an enormous amount of data, attempting to accurately pull what we needed from it while cancelling out all the other 'noise' was a tough task, considering neither of the three of us comes from an engineering background. The software programming and other technological development was something we were comfortable with.

Overcoming Challenges

The signal analysis of the device proved to be an interesting learning experience for our development team (fellow Co-Founders Michael Mahony and Matt Mitianiec). We were able to develop a basic method of analysing the signal which allowed us to get a working prototype up and running in April of this year, which we then put into testing with the High Performance Strength and Conditioning Team in the Mardyke Arena. At that stage we were still getting quite a bit of interference and misreads from the signal which was resulting in inaccurate information being provided by our software.

To overcome this we decided to attempt to make use of the Innovation Voucher scheme from Enterprise Ireland and applied for a voucher for the specific purpose of developing a better, more robust method of signal analysis. We were successfully awarded a voucher and combined with our UCC contacts, we brought on board Dr.Simon O'Regan from the Biomedical Signal Processing Group within the university to assist with this particular part of the project. In early August, the result of this work was a much smoother analysis process which has eliminated the issues with the reading of the data and made for a smooth and accurate process.

Progress to Date and Future Plans

As of now, we are continuing to develop the product and will be running further trials with high performance sports units around the country in September with an expected launch in October. We spent nine months from October 2012 to July of this year on the Ignite Graduate Business Innovation Centre programme run by UCC. This was an enormous help to us as it provided us with the support and resources to assist us with getting the business set up and a base from which to operate from. During that period we were a featured participant at the 2013 Irish University Entrepreneurship Forum. We are now being supported by the Cork City Enterprise Board and, as previously mentioned, were the recipient of an Enterprise Ireland Innovation Voucher.

We see ourselves as a technology company first and foremost so into the future we plan to develop different applications relating to human physical performance across a range of different platforms not limiting ourselves to using the 'Kinect' camera. Having the opportunity to combine our love of sport and technology and to make a living and build a

company from it is very exciting to us and we are looking forward to the challenges and learning experiences that come along with it.